

### Directing runoff through natural areas

Natural wooded areas are extremely effective groundwater recharge areas. The best way to recharge wetlands and drinking water aquifers is through these upland areas. An LID plan creates opportunities to retain as much runoff as possible on site. Stormwater is filtered and infiltrated into the ground by directing runoff away from impervious areas and engineered drainage systems and into areas of natural vegetation.



(Source: PGDER)

### Small-scale distributed stormwater controls

LID uses a decentralized stormwater management system of small-scale controls that are located near the sources of runoff generation. These controls are designed to store, infiltrate, filter and release runoff the way natural areas do. Because LID features are small, a variety of opportunities can be found on a site to filter pollutants and control the volume and peak runoff rates of stormwater.



#### Customized site design

LID requires the designer, developer, and reviewer to work closely together to insure that the site design and construction plans protect the hydrologic functions and assets of the property. The designer must incorporate the overall watershed and basin planning strategies into the site design to ensure that the overall watershed protection objectives are met.

### Maintenance, pollution prevention, and education

In contrast to conventional centralized end-of-pipe facilities (e.g. ponds), many LID features are simple to construct and require a minimal amount of maintenance. Bioretention cells, or rain gardens, which are used on both residential and commercial developments, may only require occasional mulching. The use of pollution prevention techniques to reduce the amount of fertilizers, pesticides, and other chemicals that would otherwise enter LID features will increase the effectiveness of those features for protecting receiving waters.

### Why We Need LID

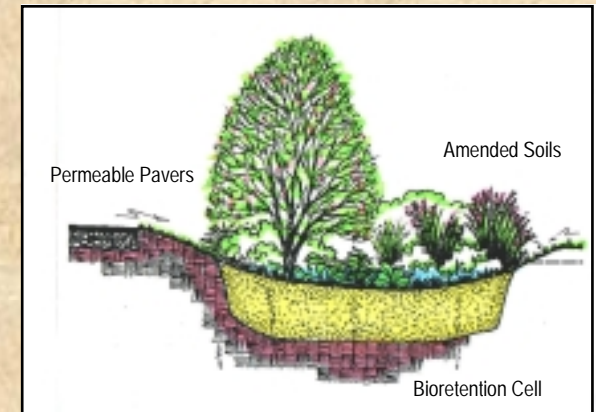
Urban development, construction, and agriculture all have an effect on the health of the Chesapeake Bay. Despite all we are doing, our current stormwater technology is not allowing us to develop and have economic growth and at the same time protect the Bay and our other natural resources.



Narrow street and bioswale

Land development and construction can severely alter many features of the landscape. Soils are compacted by construction equipment and grading. Trees and vegetation are replaced by extensive areas of impervious surface, such as roofs and pavement. Compacted soils cannot infiltrate water as effectively and there is less vegetation to soak up, store, and evaporate water. The result is that less water soaks into the ground and more runs off. This can severely degrade fish and wildlife habitat in the streams that receive runoff from developed areas. Ground water recharge, which is critical to maintain wells, is also

reduced. Conventional development also increases stream temperatures and in the amount of sediment and pollutants, such as nutrients and toxic metals.



LID Management Techniques (Source: PGDER)

Traditional end-of-pipe stormwater management techniques, such as ponds, are based on the control of large and infrequent storm events, rather than protecting the ecological health of the watershed, which is the most important stormwater objective. Most traditional systems are designed to remove water from the site as quickly and efficiently as possible, without providing opportunities for filtering of pollutants, reducing the volume or frequency of runoff, or recharging groundwater. Other problems with ponds include health risks such as habitats for mosquitoes and other disease-carrying organisms, significant long-term maintenance costs, and safety risks.

LID was developed in response to the shortcomings of conventional stormwater management technology. By incorporating a system of strategically placed small-scale distributed stormwater management techniques, we can better provide the filtering, storage, and infiltration processes that are critical for maintaining the function of the watershed. And since many LID techniques are easier to construct and maintain than traditional stormwater facilities, this should help reduce the financial burden of these facilities for developers, property owners, and communities that are responsible for the long-term effectiveness and operation of stormwater Best Management Practices.



## Where to Begin

LID has successfully been incorporated into many local government stormwater management programs in the Chesapeake Bay region and throughout the United States. The Virginia Stormwater Management and Erosion and Sediment Control regulations allow and promote the use of LID. The use of LID is being promoted by the Virginia Department of Conservation (VDCR) and the Chesapeake Bay Local Assistance Department (CBLAD) as an alternative and supplement to existing stormwater programs.



Bioretention cell at State of Maryland, Tawes Office Building

The type and amount of conservation practices that can be used in an LID design are up to the local community. LID landscaping features, such as bioretention areas, green roofs, soil amendments, or revegetation can make developments as a whole more attractive and increase the appeal of individual properties as well. Simple covenants or homeowners agreements can be used to ensure that features are properly maintained.



(Source: BES)

## LID Resources:

LID National Manual

<http://www.epa.gov/owow/nps/lidnatl.pdf>

How does your Garden Grow? A guide for homeowners.

<http://www.fws.gov/r5cbfo/conlascp.htm>

Bioretention Tour. See a rain garden near you!

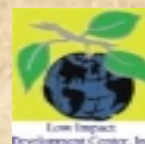
<http://for.communitypoint.org/pages/LID.htm>

## More information about LID is available at:



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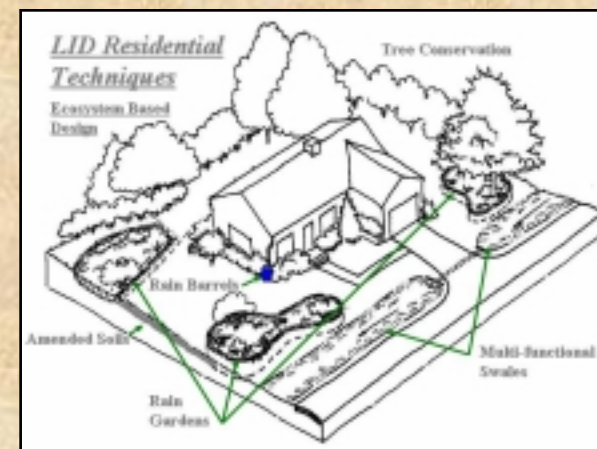


## LOW IMPACT DEVELOPMENT

*protects the Chesapeake Bay...*

## ...through a combination of:

- Conservation of natural site assets
- Directing runoff through natural areas
- Small-scale distributed stormwater controls
- Customized site design
- Maintenance, pollution prevention, and education



Schematic of LID lot (Source: PGDER)

## Conservation of natural site assets

Site planning with low impact development (LID) practices begins with developing strategies to conserve the natural hydrologic assets and functions of a site. LID site conservation techniques include directing development away from sensitive environmental areas, preserving native vegetation and soils, maintaining existing drainage courses, and minimizing the extent of impervious areas.